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DIAGENESIS AND METAMORPHISM OF STRATABOUND ORE DEPOSITS

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In this occasion, the problems of the diagenesis and burial metamorphism of some stratabound ore deposits will be addressed. The concerned deposits include those which are clearly related to, or comprise, certain stratigraphic units or sequences and sedimentary environments, and/or those situated above or below unconformities. Special attention is given to discuss the space (place) and time of formation of such deposits and the space direction of the associated constituents, in accordance with the depositional, diagenetic and metamorphic history of the host rocks. The availability, division, range, and application of the currently used genetic terms for the genesis of such deposits (e.g. primary, secondary, syngenetic, epigenetic, ...etc) are also addressed. Primary depositional features and the diagenesis of ore deposits hosted in sediments were first recognized at the beginning of this century, and gained the full attention of eminent pioneers in ore genesis in the 60's and 70's. This leap forward was clear consequence of the obvious advances in sedimentology, diagenesis and deep weathering processes and related fields of study [e.g., sequence stratigraphy, geochronology (relative and absolute), facies analysis, basin evolution and environments, geochemistry and bio-geochemistry, geomorphology and pedogenesis, paleoclimatology, submarime volcanicity and sedimentation, burial history and maturation (inorganic and organic), ...etc.].

As a matter of fact, the main processes and the related environments under consideration, i.e., deposition, diagenesis and burial metamorphism are far from being independent and narrow concepts. They are integrated approaches and interdisciplinary fields of studies, among which hundreds of variables, parameters and factors are involved.

The main information presented are collected from several new contributions that dealt with world known stratabound and stratiform deposits (sulphides, oxides, sulphates, carbonates, ...etc.). as well as new finding in the Egyptian Precambrian and Phanerozoic stratabound deposits. The scheme of the present endeavor includes the addressed subjects arranged as follows:

- **Definitions** (division, range, applications)
- **Space / Time / Source** problem and possibilities

- **Deposition (Syngenesis)**
  Environments, processes, fabrics & deformations (mechanical, chemical, biogenic); several examples from stratiform sulphides, oxides, carbonates and sulphates deposits.
- **Diagenesis**
  (syndiagenesis- anadiagenesis-epidiagenesis):
  Environments, processes, fabrics & deformations (physico- chemical, biochemical &physico-mechanical);
  Several examples from stratiform deposits with special emphasis on the **Diagenetic Crystallization Rhythmites (DCRs)**
  - **Eogenetic,** near surface processes
  - **Mesogenetic,** burial processes
  - **Telogenetic,** uplift, unconformity-related processes
    - Karstification and karst ores, several examples
    - Lateritization and bauxitization, several examples
    - Transported laterites & fluvial concentrates
- **Catagenesis = Anchimetamorphism**
  (epidiagenesis, metagenesis & metadiagenesis)
  Passing into the realm of incipient metamorphism
    - Hydrocarbon formation & kerogen evolution with sulphide formation
    - Changes of clay minerals
    - Mimetic preservation of sedimentary and diagenetic textures and formation of stratabound Fe & Mn carbonate deposits (?)
- **Burial metamorphism**
    - Diagenetic & secondary foliation
    - Pre-, syn- & post-kinematic deformations and related phases of mineral formation
    - Example from stratiform BIF and sulphide deposits.
- **Hypergenesis (Telogenesis, Supergenesis)**

Hopefully, the discussion of the points raised on this occasion would highlight the importance of reevaluating some traditional ideas and theories, and concentrate on certain proposals and new conceptional models. Many queries in the fields of ore deposition, diagenesis and metamorphism have been addressed, especially those requiring future studies. This will undoubtedly lead to ascertaining the ore genesis, its geologic setting and history, within the boundaries of a profound knowledge of the history of the host rocks. This would, in turn, help a lot in future planning of ore exploration, ore evaluation, and the strategy of ore dressing.